The MONTHLY REVIEW

Published by the

American Electro-Platers Society

v.9 #6

A SOCIETY FOR THE ADVANCEMENT
OF THE
SCIENCE OF ELECTRO-PLATING

KRESGE-HOOKER
WAYNE
UNIVERSITY
SCIENTIFIC LIBRARY

JUNE, 1922

Entered as second-class matter, August 11, 1921, at the Post Office at Grand Rapids, Mich., under the Act of August 24, 1912.

Acceptance for mailing at special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized August 12, 1918

Copyright, by American Electro-Platers Society

This book is the property of the members of the American Electro-Platers' Society. Papers printed herein are released after 10 days, except when rights are reserved.

EXECUTIVE BOARD, A. E. S., 1921-1922

President
Philip Uhl, 2432 N. 29th St., Philadelphia, Pa.

First Vice-President
S. E. Hedden, 227—5th St., Aspinwall, Pa.

Second Vice-President
F. J. Hanlon, 2921 George St., Chicago, Ill.

Secretary-Treasurer
J. E. Sterling, 468 Grand Ave., Long Island City, N. Y.

Past President
Sylvester P. Gartland, 128 Bryan St., Rochester, N. Y.

Editor
Walter J. Allen, 451 Norwood Ave., SE., Grand Rapids, Mich.

Associate Editors
Prof. Keith Kennedy, 1334 Logan St., S.E., Grand Rapids, Mich.
Dr. W. Blum, Bureau of Standards, Washington, D. C.

INDEX

Editorial 3
Electro-Deposition of Cadmium versus Zinc 4
Chemical Analysis of Brass-Plating Solutions 11
Objects of American EngineeringStandards Committee 14
What the Branches Are Doing 17
New Members, Etc 22
Branch Directory 24

Do Not Forget To Attend the Convention.
June 28, 29, 30, July 1.

MONTHLY REVIEW

Published by the

American Electro-Platers' Society

Editors' Office, 236 Wellington Ave., S.E., Grand Rapids, Mich.

VOL. IX JUNE No. 6

EDITORIAL

VALEDICTORY

It is with deep regret that your Editor finds himself obliged to announce that it will be impossible for him to be a candidate for re-election. It has been a great pleasure to him to work on this little magazine and to do his best for a successful and better magazine each month. However, the obligation to his employers, his family, and to himself make it necessary to drop a duty that, in itself, has been a pleasure.

We regret breaking off the correspondence of the office. It has kept us in touch with the big men and the honest, hard workers of our beloved A. E. S. The many men that are in touch with the office, each of them with their own personal characteristics, have added personal friendships, and also have helped to fill the cup of knowledge. We regret deeply that it is necessary to lose their monthly letters.

There are many men of the A. E. S. that are much better qualified to fill the office. Many that can give an improved **Review** to the members. We trust that the one selected will secure as much real satisfaction from the labor and duties of the office as has your present Editor.

Our last word is to the Branch members. The whole success of the A. E. S. of the future is in your hands. Make it a real success. Help your Branch officers by your presence at each and every meeting of your Branch. Give all you can to your fellow members; in that way you will receive the most for yourself. However, above all other things, give enough of your time, difficult as it may be, to attend and take some part in each and every one of the meetings of your Branch, and, **MEET ME IN CINCINNATI.**

Note—It has been necessary to shorten branch reports to a great extent this month to enable us to print all reports of Branch elections. Many of those reports contained much that was very interesting and instructive. Some of that matter, Question Box, etc., will be handed to our successor.Editor.

ELECTRO DEPOSITION OF CADMIUM VERSUS ZINC

The Relative Value of the Two Methods As a Rust Proof Coating Upon Articles Made of Iron

By Charles H. Proctor

The story of rust is a part of the history of man for when, after the stone age man commenced to fabricate things from iron for self defense and in the pursuit of peace and the necessities of life by the use of implements of iron, the story of rust commenced.

The ravages of rust are ever with us, every maker, buyer or user of metal products of whatever nature is familiar with the costly damage resulting from the ravages of rust, corrosion and oxidation. When we have truly solved the problem of rust and corrosion then perhaps even human life itself may be prolonged many, many years after the span of human life allotted to us—three score years and ten.

Men of science who have made a study of the blood corpuscles of humanity, tell us that its red color is due to iron, the more iron the more intense the red color, without iron in the blood man could not exist. If this be true then it is possible that as we pass through life, from age to age, until the end, as Shakespeare tells us in his seven ages, it is possible that it is the Rust in the blood that finally brings down the curtain of human life, even though he may survive the sixth, the seventh ends and he passes from life's stage forever. Then when we have solved the problem of rusting of the blood, even though the amount in a normal man may not exceed the weight of a ten penny wire nail, yet in its atomic form it is essential to the life of man, and some day when we have traveled further and know more of oxidation and rusting of blood, life may be prolonged indefinitely.

My story, however, has to deal with **Iron Rust** and the methods in vogue for preventing rust, and not with human blood. We might first define rust and perhaps then we can understand its nature better. Rust is primarily the result of **chemical action of oxygen** on metal.

The substance we term rust is of altogether different composition than the metal itself. The reddish deposit that gathers on iron and is known as rust is, for instance, oxide of iron or ferrous oxide. Atmospheric exposure generally creates rust. Metals exposed to the atmosphere will rust

or corrode depending upon their composition, whether iron, copper or bronze or brass. The atmosphere is composed approximately of two parts of oxygen to eight parts nitrogen. The chemical action known as rust, which attacks iron or steel, is attributed to oxygen in the atmosphere.

In reality that is only a partial statement of the fact for the atmosphere holds tenaciously to every particle of its oxygen content, as can be easily proven in the laboratory through efforts to decompose the atmosphere. Atmospheric moisture causes rust, the moisture which is really vaporized into water—two parts hydrogen (H_2) and one part oxygen (O_2). The moisture, unlike the atmosphere in which it is suspended, parts with its oxygen very readily when in contact with metals. The oxygen thereupon proceeds to rust or corrode the metal.

The purpose of Providence in sending the rain and atmospheric moisture is primarily to wash the air that all living things breathe. In the washing process, the rain, mist and moisture accumulate considerable impurities. In fact, the collection of these infinitesimal atoms of impurity is what makes the rain such a highly cultivating agent for vegetation. Salt air is more loaded with moisture than land air and therefore its oxygen content is higher. Every one knows how quickly iron rusts and the non-ferrous metals corrode when exposed to salt air. For this reason metals exposed to atmospheric conditions on, and near the ocean, must have a greater measure of protection than similar metals exposed to the atmosphere a thousand miles from the ocean.

There are forms of corrosion other than rust. That is to say, metal exposed to the atmosphere will frequently corrode and the resultant deposit will not be an oxide. There are other corroding agents in the air (either placed there by nature or through human influence) besides moisture with its oxygen content. Many of these neutralize each other to a great extent, but others do not and cause corrosion. There are, for instance, chemicals both artificially and naturally injected into the air. The "Crum-Brown Theory," brought out in 1888 was to the effect that carbon dioxide in the atmosphere was a factor in producing rust—that water and carbon dioxide react with iron to form ferrous carbonate, and hydrogen. The ferrous carbonate is subsequently changed by moist oxygen to ferric hydrate, which again regenerates to carbon dioxide, which in turn acts again upon the iron. The fallacy of this theory has evidently been

proven by the fact that it is not at all uncommon to find what was originally supposed to be ordinary rust or ferrous oxide, to be partly or largely ferric hydrate.

Yet the writer believes that carbon dioxide injected into the atmosphere by the continuous combustion of coal upon such a tremendous scale to meet modern industrial requirements, does have a quickening action in the production of rust than in pre-modern days of even two hundred years ago. Wandering through the old castles of Great Britain in my younger days, I was particularly impressed with the splendid examples of wrought iron to be found as a part of the useful and decorative art of such splendid homes of England. External wrought iron upon the massive doors never seemed to have rusted, although in many instances they had passed through hundreds of years of storms and atmospheric influence. In the olden days did they produce a better iron than we modern do, or is it as Crum-Brown believe, the injection of carbon dioxide that helps to produce more rapid corrosion and rusting of modern iron and steel.

The protection of iron and steel from rust then must be a part of man's plan. The great Creator gives us the oxygen for prolongation of life, but at the same time the same factor destroys what man creates in iron and steel. In modern days zinc has been used to a greater extent than any other factor in the protection of iron and steel. Everyone is familiar with the term **galvanizing,** which in everyday parlance means the coating of steel or iron by immersion in molten zinc. The iron is protected from rusting by the slowly corroding process of the zinc, but when the zinc becomes fairly well coated over with a mixture of zinc oxide and carbonate due to atmospheric influence, then the corroding action becomes slower and slower as the metallic coating of zinc in turn is apparently protected by its coating of carbonate and oxide.

Electro galvanizing is being used to a greater extent every year. It will never replace the molten zinc, but hand in hand these two processes will constantly be used more and more, because when all things are considered the two methods are the cheapest source of protection against rust and atmospheric corrosion of iron and steel. Modern improvements recently made in the electro deposition of zinc gives greater promise for the future that electro galvanizing will advance each year in commercial production because cost is always an important factor, and no substantial

method of rust preventative, wherever possible to use, can surpass zinc in efficiency and low cost.

Sherardizing, the vaporizing method of coating articles of iron and steel with zinc as a protective coating against rust, is a very efficient method, but it is the opinion of experts who have made comparative corrosion tests that Sherardizing does not give as an efficient protective coating upon iron or steel as hot or electro galvanized coatings.

There are many methods in vogue for the production of rust proof black coatings upon iron and steel. The earliest patents covering the rust-proofing of steel are those granted to De Bussy in July, 1864, for the precipitation of a rust-proof coating of the phosphides of iron and other similar coatings of arsenic antimony, etc., by the aid of heat. This patent fell into oblivion but was revived a few years ago by the writer.

The well known Bower-Barff process has been in use for years for producing rust-proof black coatings upon builders' hardware. The Yale & Towne Manufacturing Company, controlled this finish for many years by an exclusive license based upon patents issued in 1876 and 1880. Since the expiration of the Bower-Barff patents, other manufacturer have adopted the process. It has been conceded by authorities that in the field of small and decorative art work of iron and steel, the process has attained a higher degree of perfection as conducted in the Yale & Towne works at Stamford, Conn., than anywhere else in the world.

The Bower-Barff process consists of treating iron or steel in a special furnace operated by gas at a high temperature, whereby the surface of the metal is converted first into the sesque-oxide (FeO_3) and subsequently into the magnetic or black oxide of iron (F_3O_4). The chemical result thus obtained being permanent and unchangeable. Its color is a lustrous black of great depth and softness and is particularly effective on fine ornamental iron or steel work.

George W. Gessner of Brooklyn, N. Y., made several improvements in the Bower-Barff process upon which he obtained patents in 1888. In 1908 John W. Bradley of the same city obtained a patent upon improved methods of producing a black rust-proof coating upon iron or steel.

The original Bower-Barff process was based upon injecting steam super-heated in the muffle or furnace at cherry red heat—1250° Fahr. Gessner's improvements were based upon the injection of a hydro-carbon such as

naptha with the steam. In the Bradley process, hydrogen gas is introduced when the articles have reached a red heat in the muffle. Hydro-carbon in the form of gasoline was injected in order to improve the color of the coating.

The Bontempi method is similar to the Bradley method. Bontempi obtained a patent for the use of the various substances he claimed as accelerators in the formation of the black oxide of iron.

The well known Parker process of rust-proofing steel is based on the patent granted in England to Coslett in 1909. The method consists of boiling the steel or iron parts in phosphoric acid (H_3PO_4) which results in a coating of phosphate of iron (Fe_3PO_4). When protected by an oil coating such as linseed oil and dried, the coating is quite impervious to the action of atmospheric moisture and gives a good, black finish.

Later, Richards of Coventry, England, made an effort to secure a patent based upon the use of manganese dioxide (MnO_2) in a solution of phosphoric acid. He failed to obtain the patent in England, but later obtained one in the United States, which I believe is controlled by the Parker Company of Detroit, Mich. A later patent was granted for a similar purpose, using an acid calcium phosphate.

During last year much interest was created by the Udylite process, which consists primarily of a deposit of cadmium upon iron or steel from an ordinary cyanide solution made up from sodium cyanide, cadmium chloride, cadmium carbonate or cadmium hydrate. The patents as granted are as follows: Nos. 1388174, 1388175, 1388176, June 28, 1921, to Marion J. Udy and Frank C. Nicholson, patentees and assigned to the Udylite Process Company, Kokomo, Ind. The specific patent is based upon the assumption that when the steel coated cadmium is heated to approximately 322° C., the cadmium penetrates into the steel and forms a basic alloy on the surface of cadmium and steel which, according to the patent specifications, produces a rust-proof coating on iron or steel which is superior to any other method. However, the patents are specific patents and only cover the heating of the steel after cadmium plating.

E. Isaac and G. Tainman of the University of Gottingham mentions a cadmium iron compound in Zeitung Inorganic Chemistry—pages 34 and 52, 1907, also 55, 61 and 62. They state that it is possible that cadmium and iron, like zinc and iron, form one or more compounds together. That the

compound richest in cadmium at its melting point is practically insoluble, and that its solubility only slowly, with rising temperature, increases to appreciable value. Then one would find no corresponding break in the cooling curve corresponding to the primary separation of the iron-cadmium compound, but only a stopping point (or limit) at the temperature of melting of cadmium as actually found. A copper sulphate solution produces no red coating upon it, then the relation may be the same as between zinc and iron. This can only be determined when the cooling curves of the iron-cadmium mixtures are taken under pressure above the vapor pressure of the mixture.

The deposition of cadmium has been known and experimented with for years, but just as cobalt can never fill the place of nickel, so cadmium can never fill the place of zinc in the commercial field of rust-proofing of steel, unless the price can show a comparison with zinc which, under existing conditions, it never can.

There is a good deal of atmosphere to the Udylite process, which is included in the heating methods, but the American manufacturer requires something more substantial for his good dollars than superheated hot air.

The first patent for cadmium plating was granted to Russell and Woolrich in England in 1849. Nine years after the discovery of cyanide silver plating in England. The formula was substantially as follows:

Water	1 gallon
Potassium cyanide	5 ounces
Cadmium sulphate converted to carbonate	2 ounces

The formula prescribed by the Udylite process is substantially as follows:

Water	1 gallon
Sodium cyanide	6½ ounces
Cadmium hydrate	4 ounces
Sodium hydroxide	1 ounce

The late Erwin Sperry, in the Brass World in February, 1908, page 68, states that "cadmium is now being plated upon steel in the following manner: Eight ounces of chloride of cadmium are dissolved in a gallon of water and heated nearly to boiling. Carbonate of soda is now added to throw down the precipitated carbonate of cadmium. This is filtered out and washed with water. While still moist the precipitate is dissolved in a solution made by dissolving 12

ounces of cyanide of potash in 2 gallons of water. This constitutes the bath. It should be used at a temperature of 100 degrees F. Cadmium anodes should be used and a current with tension of from 4 to 5 volts. The deposit is nearly the same color as tin, but when buffed is considerably whiter in color. It is also harder and is free from the characteristic smell of tin."

A very able article on the same subject, "The Electro Deposition of Cadmium," by the late Emmanuel Blassett, Jr., can be found in The Metal Industry, December, 1911, page 509. There is also another article in The Metal Industry, December, 1920, page 556, by W. G. Knox, associated with the Chemical Laboratory of the Western Electric Company, Inc., entitled, "Metal Plating," and which treats in detail the subject of cadmium plating with various solutions.

In the Monthly Review of the American Electro Platers' Society, January, 1921, page 11, there appears an interesting article on the use of cadmium in the plating industry, by H. T. Cain.

Cadmium deposits upon steel will withstand a 5 per cent continuous salt spray test twice as long as a similar deposit of zinc on a similar surface area. However, under the Preece test, that is, immersion in copper sulphate solutions acid free, cadmium and zinc deposits will withstand equal immersions for the same amount of cadmium or zinc deposited by weight. Under actual atmospheric corrosive tests the results are identical, so when actual costs of rust-proofing iron and steel is fully considered based upon the monetary value of cadmium and zinc, zinc will be found to be supreme even as nickel is supreme as compared with cobalt.

If we consider the cost of the deposition of cadmium and zinc from alkaline solutions of cyanides and sodium hydroxide, figuring a basis of 10 cents per pound for zinc anodes and 40 cents per pound for the metallic salt used in solution, then the cost per pound for depositing one pound of metal from such a solution would be approximately 25 cents. However, it would be necessary to double these figures to include power consumption, incidentals, etc., so the cost would equal 50 cents, and 18 automobile rims of the Ford motor type could then be plated for 50 cents.

Cadmium anodes are worth at least one dollar per pound and cadmium hydrate $1.25, or a total of at least $2.00 per

pound of cadmium deposited. If the figures are doubled, then the cost would be $4.00 per pound, but as the current consumption, incidentals, etc., would be the same as those for zinc, but the metal loss would be greater owing to the higher price of cadmium, we can safely figure $2.75 per pound for deposited metal or 15 cents for metal deposited upon one Ford auto rim if cadmium is used and three cents if zinc is used.

If insoluble anodes of carbon were used, as prescribed in the Udylite patents, then the cost of deposition of cadmium would easily double the figures given above, because the replenishing of the cadmium solution would have to be made entirely of cadmium hydrate, whereas if cadmium anodes were used, at least 50% cadmium would be reduced from the anodes and 50% from solution.

It is the false impression gained that insoluble anodes could be used entirely with the Udylite process that has appealed to many industrial firms that should have known better. They fell easy prey to the idea that the Udylite solutions would never have to be replenished. There is still in the industrial world such men as the late P. T. Barnum declared were born—"one every minute"—and our patent office also seems to be full of them. Thousands of patents granted each year are not worth the paper they are printed upon, but Uncle Sam smiles on because "fools and their money are soon parted."

So I leave to the commercial world the decision as to the comparative value of cadmium and zinc as a rust-proof protective coating for iron and steel which, when considered from those great factors, dollars and cents, still remains in the favor of zinc and will continue to do so until cadmium becomes its equal, based upon those same great factors—dollars and cents.

CHEMICAL ANALYSIS OF BRASS PLATING SOLUTIONS

Read at Chicago by John C. Kretschmer, Chicago Branch

This paper, it is understood, may not be exactly correct or perfect, but I used these methods some years ago as a control with success, and am passing them on for what they are worth.

Try to get the solution working good; then make an analysis of the three principal ingredients, namely, cyanide, copper

and zinc. Make a note of each, and try to keep as close to the notes as possible.

Three standard solutions are required; also two indicators. The first, silver nitrate, is used to determine free cyanide; potassium iodide is used as indicator. The second, sodium cyanide, is used to determine copper. The third, potassium ferro cyanide, is used to determine zinc; uranium nitrate is used as indicator.

Standard Silver Nitrate Solution

Dissolve 17 grams of C. P. silver nitrate in 1 liter of freshly distilled water. Each cc. of this solution is equal to .0098 gram sodium cyanide.

Indicator

Dissolve 1.5 grams or so of potassium iodide in about 100 cc. of distilled water.

Test for Free Sodium Cyanide

Take 10 cc. of the brass solution, dilute to 100 cc. with water, add about 5 cc. or so of postassium iodide, and titrate with the N/10 silver nitrate until a faint cloudiness is observed. This is the end point. Note the number of cc. N/10 silver nitrate solution used. Suppose it were say 10.1 cc. Now 1 cc. of the silver solution is equal to .0098 gram sodium cyanide. Then 10.1 x .0098 x 100÷75=1.31 oz. sodium cyanide per gallon of brass plating solution. Or use the co-efficient .13, which shortens the calculations. Example: 10.1X.13=1.31.

It is very necessary to use potassium iodide as indicator, because of the great excess of ammonia or sodium hydroxide in some brass plating solutions. The titration should be carried out so as to get the exact end point.

Standard Sodium Cyanide Solution

Dissolve about 30 grams of C. P. 96%-98% sodium cyanide in 1 liter distilled water. This solution must be checked against a known weight of pure copper. Dissolve .25 gram of C. P. copper foil in dilute aqua regia (hydrochloric acid 3 parts, nitric acid 1 part), dilute to about 150 cc. with water; add a solution of pure sodium carbonate until a precipitate is formed, then add 1 cc. of C. P. 26° ammonia and titrate with sodium cyanide. The copper solution is of a deep blue color and the cyanide is added until this changes to a faint pink; this is the end point. Note the number of cc. of sodium cyanide used. Suppose it were say 21.5 cc., then .25÷21.5=.01162. This number is the factor for the sodium cyanide solution.

Test for Copper

The copper is the next to be tested, but it must first be separated from the zinc. Take 10 cc. of the brass plating solution and add 10 cc. of concentrated sulphuric acid, very slowly. This operation should be performed under a hood, as the fumes given off are very poisonous. This operation precipitates the copper as cuprous cyanide, and at the same time zinc sulphate is formed, which is dissolved in the solution. Add 35 or 40 cc. of water and let stand a few minutes.

The precipitate is then filtered off and washed with distilled water, until a few drops of the wash water give no color with potassium ferro-cyanide. Dissolve the precipitate in aqua regia. Then precipitate the copper, add the ammonia and titrate in the same manner as when standardizing. Note the number of cc. sodium cyanide used. Suppose it took say 12.5 cc, then 12.5 x .01162 x 100÷7.5=1.93 oz. copper per gallon of brass plating solution.

Standard Potassium Ferro-Cyanide Solution

Dissolve 32.45 grams of C. P. crystallized potassium ferro-cyanide in 1 liter of distilled water.

Indicator

Dissolve about 3 grams of uranium nitrate in 100 cc. of distilled water.

Deteriorated Crystals

If the potassium ferro-cyanide crystals have deteriorated, the solution will have to be standardized against a known weight of C. P. zinc. The zinc is dissolved in dilute sulphuric acid, a slight excess of ammonia is added, and the solution brought to the neutral point by cautiously adding hydrochloric acid. Then add 4 cc. of concentrated hydrochloric acid and titrate with potassium ferro-cyanide, using an outside indicator and a spot plate. The zinc solutions are usually divided in half and one-half titrated to find out about how much of the titrating solution is required; about 1 cc. is added at a time until a drop of solution produces a brown color when placed on or next to a drop of the indicator. Then mix the two halves and note the burette reading. Then again add potassium ferro-cyanide to within .5 cc. of double the first reading. Now remove a drop and test with the indicator. If no color is observed, add more of the titrating solution slowly, stirring thoroly and testing after each addition of .1 or .2 cc., until the end point is reached.

It is very important to make as few tests as possible, as the

removal of each drop of solution means a loss of so much zinc, and the final result will be correspondingly low. Now note the burette reading. The weight of zinc taken for test divided by the number of cc. titrating solution used gives the factor for potassium ferro-cyanide solution.

Test for Zinc

The filtrate and washings from the copper contains the zinc. It should be tested for copper by adding a small amount of C. P. 26° ammonia; if a blue color or precipitate does not develop, copper may be assumed to be absent. A slight excess of ammonia is then added and the solution brought to the neutral point by cautiously adding hydrochloric acid. Then add 4 cc. concentrated hydrochloric acid and the titration is carried out in the same manner as in standardizing. The same conditions should prevail, such as temperature, bulk of solution, etc.

Now note the burette readings. The number of cc. used times the factor times 100, divided by 7.5, gives the ounces of zinc per gallon of brass plating solution.

To Convert an Ounce of Metal to Pounds of Salts or Compound

Copper

Oz. copper to lbs. copper sulphate	x .246
Oz. copper to lbs. copper carbonate	x .121
Oz. copper to lbs. copper cyanide	x .088

Zinc

Oz. zinc to lbs. zinc culphate	x .275
Oz. zinc to lbs. zinc carbonate	x .120
Oz. zinc to lbs. zinc cyanide	x .110

OBJECTS OF AMERICAN ENGINEERING STANDARDS COMMITTEE

The objects of the American Engineering Standards Committee briefly stated are:

"To unify methods of arriving at engineering standards, and to secure co-operation between various interested organizations, in order to prevent duplication of work and promulgation of conflicting standards.

"To receive and pass upon recommendations for standards but not to initiate or develop the details of any particular standard.

"To act as an authoritative channel of coöperation in international engineering standardization.

"To promote in foreign countries the knowledge of recognized American Standards.

"To collect and classify data on standards and standardization bodies in the United States and foreign countries, and to act as a bureau of information regarding standardization."

As a result of the work in which the American Engineering Standards Committee is now actively engaged, existing conflicting standards are being brought into harmony, and there are being created truly representative committees to formulate new standards. The methods employed obviously differ somewhat from methods utilized hitherto, and it must be acknowledged that they are not yet fully understood by many of the organizations in America that should be co-operating in standardization along national lines.

The Rules of Procedure of the American Engineering Standards Committee are at times misunderstood, not by reason of their complexity, but because of their extreme simplicity. Only when a standard has been formulated under such auspices that it has the endorsement of substantially the whole of the industry to which it applies, it is considered qualified to be designated an "American Standard." The advantage resulting from insuring that all standards to be thus designated have been formulated under the proper auspices and are acceptable to the industry involved, are so self-evident that it is sometimes difficult to understand why everyone does not appreciate the industrial significance of the work of the American Engineering Standards Committee. The Committee does not concern itself with the technical details of the standards submitted to it for approval, or formulated by committees organized under its auspices, but limits its investigations to a study of the procedure followed in developing the standard with particular reference to the representative character of the group of persons by which the standard has been formulated and the organizations by which it has been adopted or approved.

The decision of the American Engineering Standards Committee not to deal with technical details has proved a source of great strength in its real work of insuring the full co-operation of organizations producing standards not in conflict.

AN EXAMPLE OF FUNCTIONING OF THE A. E. S. C.

In determining the desirability of undertaking the development of a proposed standard, it has proved highly satisfactory to initiate the movement by calling a conference of the

bodies interested, which the A. E. S. C. does upon request from a responsible organization or organizations.

As an example of such a conference, mention may well be made of the Conference on the Standardization of Railroad Ties held in Washington, D. C., in October, 1921, at the joint request of the Forest Service and the American Railway Engineering Association. Invitations to this Conference were issued to the several national organizations representing not only producers and consumers, but also general interests, the last mentioned being the American Society of Civil Engineers, the American Society for Testing Materials, the Department of Commerce, and the Forest Service. The official representatives of the organizations were asked to decide: (1) whether the unification of specifications for railway cross-ties and switch ties should be undertaken; (2) if so, what the scope of the work should be; and (3) how the work should be organized.

After a very full discussion of all phases of the important problem before it, this Committee reached a unanimous agreement on all points under consideration. It recommended that the Forest Service and the A. E. R. A. be designated as joint sponsors for a "Sectional Committee" to unify railway-tie specifications under the Rules of Procedure and auspices of the A. E. S. C., and recommended to the sponsors that certain specified national organizations be invited to be represented officially on the sectional committee. Altho it might seem apparent, without discussion, that the unification of railway-tie specifications should be undertaken, the subject was discussed for two hours before the Conference was asked to place itself on record on this matter, which it did by unanimous vote. All of this discussion was beneficial in paving the way for the discussion of the scope of the work and the organization therefor.

A conference called as this conference was called and conducted as this conference was conducted results in a spirit of co-operation that cannot otherwise be brought into existence. The plans laid down for carrying out the work of standardization will insure that the coöperative spirit brought into being by the conference will continue to be the controling feature of the work of eliminating existing conflicting standards ad "Americanizing" the standards that will be formulated hereafter.

Too much emphasis cannot be put upon the advantages of the conference method of initiating work on any particular

standard or set of standards, provided the conference is truly representative. When men get together in such a conference, from an interchange of ideas they obtain a comprehensive view of the whole field; harmony emerges from discord and differences disappear in agreement.

ADVANTAGES OF NATIONAL STANDARDIZATION REITERATED

In closing, it cannot be too often repeated, that a national standardization program means almost unlimited advantage to the manufacturer in cheapening the processes of production and stabilizing his market; to the distributor in clarifying and simplifying his problems; and to the ultimate consumer by lessening costs and expediting deliveries. The real significance of standardization to industry and the Federal Government—what it may mean and what it can accomplish, will not be fully realized until there is sincere co-operation which is sympathetic, systematic, and comprehensive, between industry and the Federal Government, in which co-operation the general consumer has a part.

WHAT THE BRANCHES ARE DOING

ST. LOUIS

On June 3rd we had a real meeting, having with us Messrs. Weil and Robins for a talk and demonstration of several indicators in color tests. Mr. Weil, a graduate of the Massachusetts Institute of Technology, gave us first a talk on the theory of indicators and then showed us what to expect. "Acidity of Nickel Solutions" was the subject for discussion, it being the first meeting given over to it.

One new member was elected; then, after usual business, the officers-elect were installed by ex-President George Lamkemeyer.

The St. Louis Branch has always been fortunate in having a progressive set of officers, and the new officers will surely maintain its record.

CLEVELAND

Dear Editor:—

You are undoubtedly feeling somewhat disappointed at the showing the Cleveland Branch is making in late issues of THE REVIEW, and yours truly is affected by the same malady, and this is caused more by slim attendance at meetings than anything else. At our last meeting, when we elected officers for the ensuing year, there were about as many members present as there were offices to be filled. Very encouraging, I don't say. Those accepting the honors were:

President, W. D. Scott; Vice-President, J. C. Singler; Librarian, H. J. Ter Doest; Secretary-Treasurer, B. F. McCormick; Board of Man-

agers, A. E. Somerville, C. J. Carrick, H. S. Kneeland; Delegates to the Convention, H. J. Ter Doest, B. Hengst, J. C. Singler; Alternate Delegates, W. D. Scott, A. E. Somerville, E. Troxler.

Election of officers was all the business that was handled during the evening.

PHILADELPHIA

The June meeting of Philadelphia Branch was held on June 2, with President Gehling in the chair.

One new member was elected and one application was received.

A general discussion was held on the Spotting-out problem. All the old remedies were threshed over, but nothing new developed.

DETROIT

The following officers were elected by Detroit Branch for the year ending May 31, 1923:

President, O. H. Phelps; Vice-President, R. E. Miller; Secretary-Treasurer, E. W. Woodmansee; Board of Managers, C. W. Cunningham, E. G. Lovering, A. J. Fritz; Librarian, W. E. White; Sergeant-at-Arms, S. D. Kuchry; Delegates to the Convention, E. W. Woodmansee, W. E. White, C. W. Cunningham; Alternate Delegates, A. Partensky, A. E. Shepherd, W. M. Phillips.

CHICAGO

The regular monthly meeting of Chicago Branch was held on June 10, with President George Burt in the chair, who then introduced the new president, Mr. Bott, and he made a very nice little speech of introduction and also thanked the boys for their coöperation during his term as President.

Mr. Bott then spoke along the lines of regular attendance at the meetings of the members, and also requested their coöperation for the ensuing year.

We had with us three members of St. Louis Branch, and one from Detroit.

The Convention Committee reports a large amount of interest in the Convention, and a carload for attendance at the same, and eight or ten papers of real educational matter. Chicago Branch made no mistake in their selection of this Committee.

The new President, Mr. Botts, appointed R. J. Hazucha to the office of Sergeant-at-Arms.

One candidate was elected to active membership. Three applications were received.

CHICAGO QUESTION-BOX

QUESTION NO. 1—What is a good dip to neutralize cyanide?

ANSWER NO. 1—Good clean hot water was thought best.

QUESTION NO. 2—Wanted: a formula for a bronze solution.

ANSWER NO. 2—It was suggested to make up a copper solution, hang anode upon cathode-rod, then add zinc dissolved in cyanide until

the desired color was obtained; then add 2 oz. carbonate of soda to the gallon. It was also stated that to harden the deposit, a small amount of cyanide of tin could be added.

QUESTION NO. 3—What oxidizing solution will give you a brown color on bronze?

ANSWER NO. 3—It was stated that liver of sulphur solution, heated, would do this.

QUESTION NO. 4—What is the best method to prepare angle iron, hot-rolled, for electro-galvanizing?

ANSWER NO. 4—It was thought sand blasting was the best way. It also can be done by using a pickle consisting of 1½ gal. of sulphuric acid, 3 gals. muriatic acid, and ½ gal. nitric acid, adding this to 50 gals. of water, which will clean off scale and brighten so it can be immersed in zinc without further preparation.

QUESTION NO. 5—What would cause nickel to pit when heated, and not to pit when cold?

ANSWER NO. 5—It was thought that the same might be too acid, and heating caused increased conducting and caused deposit to pit. The member asking this question stated that this occurred in a pitch-lined tank, and when he removed the solution from this tank and filtered the same and run it in an unlined tank, it did not pit, and he thought that the oil from the pitch might cause this phenomenon.

QUESTION NO. 6—What causes dark nickel deposits? What is the cause of nickel staining or leaving spots on work after touching it with the hands?

ANSWER NO. 6—It was thought that the solution was alkaline. The member asking this question stated that after adding hydrofluoric acid and the solution remained unchanged, they examined the metal content and found three and eight-tenths oz. to the gallon, which they reduced to two oz. per gallon, and added clear water and the disturbance disappeared and plated white and clean.

NEWARK

The regular meeting of Newark Branch A. E. S., was held in its new quarters, 17 Central Ave., on Friday evening, June 2, with ten members present, Mr. Phil. Sievering, President, occupying the chair.

The election of delegates to the Cincinnati Convention resulted as follows: Mr. H. H. Smith, Edw. W. T. Faint, Phil. Sievering. The following officers were installed to serve for the ensuing year, Mr. Henry Bergfels acting as installing officer:

President, Oliver J. Sizelove; Vice-President, O. F. Carlson; Secretary, Royal F. Clark; Treasurer, C. A. Stiehle; Trustees, George Reuter, H. H. Smith, Phil. Sievering, Conrad Frey, Chas. Piske.

PROVIDENCE

We have elected the following as officers for the coming year: President, Levi Perkins; Vice-President, Robert Crook; Secretary-Treasurer, Carlton J. Poyton; Assistant Secretary, James Simpson; Board of Education, John McDonough; Librarian, Louis Martin; Sergeant-at-

Arms, James Potter; Board of Managers, John Garrick, Harry Tholes, Ernest Alsfeld, John Andrews (Galvin J. Tyndall, Chairman). Our installation will take place next meeting night, first Thursday in June.

BOSTON

Boston branch met Friday the 19th, with President Nihan in the chair. Two applicants were elected to membership. As Boston branch could not afford to send a delegate to the convention, it was moved that Prov.-Attelboro branch represent Boston branch. The warm weather coming on, the branch voted not to hold a meeting again until Sept. 15th. As there will be no meeting in June, the following officers were elected for the coming year: President, J. J. Nihan; Vice-President, Louis Gale; Secretary-Treasurer, Andrew W. Garrett; Librarian, Francis Mackie; Sergeant-at-Arms, Edward J. White; and five Trustees, Philip Nelsen, Chairman, Ralph Barnstead, Andrew Talamona, Charles H. Morton, and Sam Herrick.

BRIDGEPORT

Our regular meeting was held May 19th, 1922, with twenty-five members present, J. W. Slattery, presiding.

The following officers were elected for the ensuing year, to-wit: J. W. Slattery, President; W. Thompson, Vice-President; Francis J. Spaine, Secretary-Treasurer; J. Dunn, W. Stratton, W. Flaherty, Board of Managers; D. Fleming, George Belle, John O'Neil, Laboratory Committee; and J. F. Spaine, Librarian. The delegates for the 1922 Convention were elected, as follows: J. W. Dunn, A. Reeves, W. Flaherty; alternates being H. Dawson, W. Stratton and D. Fleming.

MILWAUKEE

In place of our regular educational meeting on Thursday, May 25, we had installation of officers and a farewell party to our beloved friend Rudy J. Hazucha, who leaves us to take up his place in the rank and file of the Chicago Branch. Mr. Hazucha was appointed installing officer and with pomp and dignity the following officers were installed: President, Ray Goodsell; vice president, Gust Gehrke; secretary-Treasurer, Robert Steuernagel; Sergeant-at-Arms, Henry Hurtig; Librarian, Daniel A. Nittig; Board of Managers, Frank Marx, Arthur Koehler, Jos. Birbaum.

GRAND RAPIDS

The Grand Rapids Branch held its regular meeting Wednesday, May 1, with a good attendance on hand. All agreed the banquet was a good one.

The following officers were elected: Jacob Van Dyke, President; John Dykman, Vice-President; Chas. S. Whalley, Secretary-Treasurer.

NEW YORK

The regular meetings of the N. Y. B. Branch were held on May 12th and May 26th. President J. A. Stremel presided at the first; Acting President Wm. Fisher presided at the last meeting. Four applications were received for membership.

Officers elected for the coming year are as follows: President, Phillip Morningstar; Vice-President, William Fisher; Secretary and Treasurer, John Sterling; Recording Secretary, Arthur Grinham; Sergeant-at-Arms, James Eagon; Assistant Sergeant-at-Arms, Benjamin Cross. Trustees elected to office are as follows: Emel Haas, Joseph Minges, Elias Schor, Thomas Haddow, Wm. Voss and Fred Houshalter. Active Delegates elected, John Sterling, Charles Proctor, Joseph Haas; Alternates, Thomas Haddow, Phillip Morningstar and George Wilson.

FINAL PLEA FROM YOUR SUPREME SECRETARY

New York, N. Y., June 13, 1922.

The undersigned respectfully requests every member or anyone intending to go to Cincinnati, Ohio, any time between June 24th and 30th inclusive, to be sure to request a certificate when purchasing their railroad tickets. It is immaterial whether you or your friends expect to attend the Convention or not, obtain the certificates anyway, even if you do not intend to use them on the return journey. Turn them in to the Secretary when you arrive. If you know of or hear of anyone going to Cincinnati during the above mentioned period, request them to do you a favor by obtaining a certificate, and hand it over to you to bring with you, or if you cannot go to the Convention yourself, give it it to someone who is going.

It is up to every member to do all he can to help us obtain the necessary 250 certificates, so that those who wish, can avail themselves of the reduced fare on the return journey.

Will you please try also to help us to get that 1,000 membership by June 28th? Thank you!

JOHN E. STERLING,
Supreme Secretary.

NEW MEMBERS

Chicago

Homer A. Walter.....c/o Frost Mfg. Co., Kenosha, Wis.

New York

Charles J. Menagh.....615 Lexington Ave., Brooklyn, N. Y.

St. Louis

Faraday J. Strock.....3129a Morganford Road, St. Louis, Mo.

Boston

J. H. Wall.....84 Pembrook St., Boston, Mass.
John T. Evans.....155 Robbins St., Waltham, Mass.

Philadelphia

Leo Reiss.....629 Vine St., Philadelphia, Pa.

Dayton

W. A. Brandt.....815 Richard St., Dayton, Ohio
M. G. Kopf.....63 Virginia Ave., Dayton, Ohio
W. Donly.....111 Gunkel Ave., Dayton, Ohio

APPLICATIONS FOR MEMBERSHIP

Bridgeport

Raymond J. O'Connor.....Bridgeport, Conn.

Indianapolis

Arthur C. Lamb.....640 E. Ohio St., Indianapolis, Ind.
William H. Henderson.....208 E. North St., Kokomo, Ind.

New York

W. R. Carlton.....1126 Pacific St., Brooklyn, N. Y.
William Strein.....155 Wykoff Ave., Brooklyn, N. Y.

Chicago

C. P. Moyen.....c/o Waukegan Chemical Co.
G. H. Hurtig.....c/o Chicago Spring Butt Co.
W. C. White.....c/o Chicago City Plating Works

Cincinnati

John F. Locke.....Fisher Place, Cincinnati, Ohio
F. Breuwer.....548 W. Liberty St., Cincinnati, Ohio
F. E. Rapp.....5309 Carthage Ave., Norwood, Ohio
H. Flammer.....5311 Globe Ave., Norwood, Ohio
H. Coyle.....Crescent Spring, Erlanger, Kentucky

TRANSFERS GRANTED

Dayton

F. J. Cyrex.....Transferred to Cleveland Branch

Last Call to the Convention

at the City of

CINCINNATI

The A. E. S. will hold the greatest of all their Conventions at the Hotel GIBSON

June 28, 29, 30, and July 1, 1922

There will be much for every Electro-Plater
There Will Be More For His Employer
HE will reap the DOLLAR Benefit

Send your Plater, your Superintendent and come Yourself

OBITUARY

MR. J. T. McCARTHY, a charter member of St. Louis Branch, died on the 24th day of May. Death was caused by worry over the outcome of a serious operation which had been performed upon his wife.

Two meetings previous Mr. McCarthy had read a paper on "Pitting", which was well appreciated. St. Louis Branch and the whole membership of the A. E. S. will regret his passing.

Mr. McCarthy was an enthusiastic and hard-working member of the A. E. S.

BRANCH DIRECTORY

BOSTON

Regular meetings are held second and fourth Thursdays of each month, at 8 p. m., at the American House, Boston. Secretary, A. W. Garrett, 37 Dorset St., Dorchester, Mass.

BRIDGEPORT

Meets third Friday of each month in its laboratory, 260 John St., Bridgeport, Conn. Secretary, Francis J. Spaine, 1323 N. Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., at the Hardware Club of Chicago, Room 1125. Secretary, F. J. Hanlon, 2921 George St., Chicago, Ill.

CINCINNATI

Meets on the first and third Friday of each month, at 1262 State Ave. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets last Saturday of each month at Hotel Winton. Secretary, B. F. McCormick, 2024 Wyandotte Ave., Lakewood, O.

CONNECTICUT VALLEY

Meets on the second Tuesday of each month at 202 Washington St., Hartford, Conn. Secretary, Tennant K. Elwin, P. O. Box 77, Newington, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, C. Van Derau, 61 Bish Ave. Dayton, Ohio.

DETROIT

Secretary, E. W. Woodmansee, 1427 Lee Place, Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., NE. Secretary, Chas. F. Whalley, 931 Pine Ave., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1728 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at the West Side Bank Bldg. Secretary, R. Steuernagel, 1508 Concordia Ave., Milwaukee, Wis.

MONTREAL

Secretary. A. Geroux, 48 Craig West, Montreal, Quebec, Canada.

NEWARK

Meets first, third and fifth Fridays of each month at Forresters' Home, 20 Central Ave., Newark, N. J., at 8 p m Secretary, Royal F. Clark, 71 Chadwick Ave., Newark, N.J.

NEW YORK

Meets second and fourth Fridays of each month at the Broadway Central Hotel Parlors, New York City. Secretary, John E. Sterling, 468 Grand Ave., Long Island City, N.Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 26 Custom House St., Room 16. Secretary, C. J. Poyton, 269 Ohio Ave., Providence, R. I.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading, Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Hotel Seneca. Albert H. Doering, Secretary, 49 Cutler St., Rochester, N. Y.

SYRACUSE

Secretary, M. J. Crean, 109 Court St., Syracuse N. Y.

ST. LOUIS

Meets first Saturday of each month at Barr Branch Library, corner Jefferson and Lafayette Sts. Secretary, H. H. Williams, 4156 Botanical Ave., St. Louis, Mo.

TOLEDO

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, H. L. Myers, 410 Palmer, Toledo, Ohio.

TORONTO

Meets second Thursday of each month at Occident Hall, Bathurst and Queen Sts. Secretary, C. Kemish, 271 Boston Ave., Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month Secretary, Wm. Delage, 47 Prospect St., Waterbury, Conn.